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# बुने वस्त्रों की लम्बाई और चौड़ाई नापने की पद्धति

( दूसरा पुनरीक्षण )

*Indian Standard*

# DETERMINATION OF LENGTH AND WIDTH OF WOVEN FABRICS – METHODS

*( Second Revision )*

UDC 677·074 : 677·017·222/223

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NEW DELHI 110002

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Physical Method of Test Sectional Committee, TXD 1

## FOREWORD

This Indian Standard ( Second Revision ) was adopted by the Bureau of Indian Standards on 31 May 1990, after the draft finalized by the Physical Methods of Test Sectional Committee had been approved by the Textile Division Council.

This Indian Standard published in 1961 was first revised in 1969. It is again being revised to align it with 'ISO 69 2-1 976 Textiles—woven fabrics: Measurement of width of pieces' and 'ISO 6933-1976 Textiles—woven fabrics: Measurement of length of pieces' issued by the International Organization for Standardization (ISO). In this revison, another method based on measuring length and width of fabric in prevailing atmosphere and then correcting to standard atmosphere has been incorporated. This method is suitable for those fabric pieces which can not be conditioned completely in the standard atmosphere. The earlier method is applicable to only those fabric pieces which can be conditioned completely in the standard atmosphere.

The length and width of a piece of fabric is influenced by the strains imposed during manufacture, finishing and storage, and by the moisture content of the fabric at the time of measurement. In order to determine these accurately it is, therefore, essential to allow the fabric to become relaxed and to condition it ( preferably in the standard atmosphere ) before the measurements are made.

In reporting the result of a test made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values ( *revised* )'.

# *Indian Standard*

# DETERMINATION OF LENGTH AND WIDTH OF WOVEN FABRICS – METHODS

## *( Second Revision )*

## 1 SCOPE

**1.1** This standard prescribes two methods for determination of length and width of pieces ( of any length ) of all kinds of woven fabrics that are in the state of relaxation obtained by exposure ( free from applied tension ) to the standard atmosphere.

**1.2** The methods are applicable to woven fabrics ( including 'stretch' fabrics ) made up full width or folded down the middle.

## 2 REFERENCES

**2.1** The Indian Standard IS 6359 : 1971 'Method for conditioning of textiles' is necessary adjunct to this standard.

## 3 TERMINOLOGY

### 3.1 Length of Piece

The distance between the outermost eomplete weft thread in a piece, other than weft threads of other materials at the end(s) of the piece.

### 3.2 Width of Piece

**3.2.1** *Overall Width*

The distance, at right angles to the length of the fabric, between the outermost warp thread in a piece.

**3.2.2** *Width Between Lists or Selvedges ( Usable Width )*

The distance, at right angles to the length of the fabric, between the outermost warp thread of the body of the fabric.

## 4 APPARATUS

**4.1 Calibrated Steel Rule** of length at least 2 m ( preferably 3 m ), and graduated in centimetres and millimetres.

**4.2 Table** having a smooth flat surface, of width greater than that of the fabric when prepared for measuring, and of length at least 4 m.

NOTE — If a table of substantially greater length is used, the distance between temporary marks ( *see* **7.2.1** and **7.2.3** ) may also be increased.

## 5 ATMOSPHERIC CONDITIONS FOR CONDITIONING AND TESTING

**5.1** The fabric pieces shall be conditioned to moisture equilibrium in the standard atmosphere of 65±2 percent relative humidity and 27 ± 2°C temperature from the dry side ( *see also* IS 6359 : 1971 ).

NOTE — The strain imposed during manufacturing and finishing may appreciably affect the length and width of fabrics, and some recovery may take place during storage. It is, therefore, advisable for fabrics to remain unrolled and freely exposed for as long as possible in order to allow for relaxation before taking measurements. Fabrics containing threads of rubber may require a period not less than four days for relaxation.

**5.2** The testing of fabric pieces shall be carried out in the standard atmosphere ( *see* **5.1** ) or prevailing atmosphere depending upon the method used.

## 6 SAMPLING

**6.1** Sample from the lot shall be drawn so as to be representative of the lot. Sample drawn in accordance with the relevant material specification or as agreed to between the buyer and the seller shall be representative of the lot.

## 7 DETERMINATION OF LENGTH

### 7.1 Location of Marks and Measurements

**7.1.1** *Fabric Made up Full Width*

Measure and mark the fabric along two lines, each positioned at a distance of about one-quarter of the width of the fabric from the adjacent selvedge.

**7.1.2** *Fabric Folded Down the Middle*

Measure to the nearest millimetre and mark one side of the fabric along a line approximately halfway between the selvedge and the fold, then turn the fabric over and mark and measure the other side in a similar manner.

NOTE — Pieces of width less than that of the measuring table may be opened and measured as described in **7.1.1**.

### 7.2 Method 1

**7.2.1** *Preliminary Markings*

Place the piece on the table ( at full width, folded down the middle if received in this state ) so that the first 3 to 4 m portion lies flat and free from applied tension, and make temporary marks ( used only to determine completion of relaxation and conditioning ) 3 m or 2 m apart, near the end of the piece. Then draw the fabric gently along the table until the middle portion of the piece lies flat and free from applied tension, and make a second pair of temporary marks. Finally, draw the remainder of the fabric gently along the table until the last 3 to 4 m portion lies flat and free from applied tension, and make a third pair of temporary marks.

**7.2.2** *Conditioning*

With the fabric so arranged that it is free from applied tension and its surfaces are freely exposed to the standard atmosphere ( *see* Annex A ), condition it until the mean difference between the marks in each pair of temporary marks is less than 0·25 percent of the final average length.

**7.2.3** *Final Measurements*

Remove the temporary marks, place the fabric on the table and, manipulating it as described in **7.2.1**, make marks at 3 m or 2 m intervals, as relevant as prescribed in **7.1**, and measure the length of the portion between the last mark and the end of the pieces.

**7.2.4** Determine each of the two lengths measured in accordance with **7.2.3** by counting the number of 3 m or 2 m units, as relevant, marked on the piece and adding the length of the remaining portion. Take the mean of the two results ( to the nearest centimetre ) as the length of the piece.

### 7.3 Method 2

**7.3.1** *Relaxation and Relaxed Length*

Allow the piece to relax, free from applied tension, in the prevailing atmosphere for at least 24 h. Then place the piece on the table ( at full width, or folded down the middle if received in this state ) and use the procedure given in **7.2.3** to measure its relaxed length.

**7.3.2** *Marking for Determination of Correction Factor*

Manipulate the piece as described **7.2.1**, until the middle 3 to 4 m portion lies flat and free from applied tension on the table, and on this portion make four pairs of datum marks, the distance between the marks in each pair being equally spaced across the width of the fabric but no pair being nearer to a selvedge than one-tenth of the width of the fabric. Measure and record the distance between the marks in each pair.

**7.3.3** *Conditioning and Final Measurements*

Freely expose the portion marked as in **7.3.2** ( with or without removal from the piece ) to the standard atmosphere until the mean difference between successive measurements, made at intervals of at least 24 h, of the distance between the marks in each pair of datum marks is less than 0·25 percent.

**7.3.4** Calculate the length of the piece ( to the nearest centimetre ) by the formula.

$$Lc = \frac{Lr \times Lsc}{Ls}$$

where

$Lc$ = length in cm of the piece after conditioning;

$Lr$ = length in cm of the piece after relaxation in the prevailing atmosphere ( calculated as in **7.2.4** from the results of measurements made in **7.3.1** );

$Lsc$ = mean distance in cm between the datum marks on the conditioned portion; and

$Ls$ = mean distance in cm between the datum marks on the relaxed portion before conditioning ( *see* **7.3.2** ).

### 7.4 Calculation of Deficiency of Length in a Lot

**7.4.1** For calculating the deficiency of length in a lot, note down the following:

a) length of fabric, as declared by the manufacturer in the despatch note or challan ($D$);

b) total of lengths marked on all the bales in the lot ($C$);

c) total of lengths marked on all the bales selected in the sample ($B$);

d) total of lengths marked on all the pieces in the sample ($A$)

e) total of lengths marked on all the pieces in the test sample ($M$); and

f) total of measured lengths of all the pieces in the test sample ($T$).

**7.4.2** Calculate and report as follows:

*Case* 1 — If $T \geqslant M$ and $A \geqslant B$, report that there is no length deficiency in the lot.

*Case* 2 — If $T \geqslant M$ but $A < B$, report length deficiency of lot as '$X$' metres where

$$X = D - C \times \frac{A}{B}$$

*Case* 3 — If $T<M$ but $A \geqslant B$, report length deficiency of lot as '$X$' metres where

$$X = D - C \times \frac{T}{M}$$

*Case* 4 — If $T<M$ and $A<B$, report length deficiency of lot as '$X$' where $X$ is either equal to $D - C \times \frac{T}{M}$ or equal to $D - C \times \frac{A}{B}$ whichever is greater.

## 8 DETERMINATION OF WIDTH

### 8.1 Measurements

**8.1.1** Take each measurement to the nearest millimetre and with the steel rule resting on the fabric in a direction at right angles to the selvedge.

**8.1.2** Fabric folded down the middle, if received in that state, may be relaxed and conditioned in that state, but all measurements shall be taken from edge to edge with the fabric open and laid flat.

### 8.2 Method 1

**8.2.1** [ *For Pieces of Length Greater than* 5 m ]

**8.2.1.1** *Preliminary marking*

Place the piece on the table ( at full width, or folded down the middle if received in this state ) so that the first 1 to 2 m portion lies flat and free from applied tension, and make a temporay mark ( used only to determine completion of relaxation and conditioning ), at a point close to a selvedge and approximately 1 m from the end of the piece. Then draw the fabric gently along the table until the middle portion of the piece lies flat and free from applied tension, and make a second mark. Finally, draw the remainder of the fabric gently along the table until the last 1 to 2 m portion lies flat and free from applied tension and make a third temporary mark.

**8.2.1.2** *Conditioning*

With the fabric so arranged as to be free from applied tension and freely exposed to the standard atmosphere ( *see* Annex A ), condition it until the difference between successive measurements, made at intervals of at least 24 h, of the appropriate width of the fabric as determined at the three marked measuring points is less than 0·25 percent at each measuring point.

**8.2.1.3** *Final measurements*

Remove the temporary marks, place the fabric on the table and, manipulating as described in **8.2.1.1** measure the width of the fabric at least five times at equal intervals of not more than 10 m along the length of the piece, the first measurement being made at a position at least 1 m from one end of the piece and the last measurement at least 1 m from the other end.

**8.2.2** [ *For Pieces ( Samples ) of Length At Least* 0·5 m *and not Exceeding* 5 m ]

With the fabric laid flat on the table and free from applied tension, made at least four marks as equal intervals at points close to a selvedge, the first and the last marks being made not closer to the adjacent end of the fabric than one fifth of the length of the sample. Then expose the sample to the standard atmosphere and condition it at described in **8.2.1.2** but taking measurements ats each mark. Record the final readings at each point.

**8.3** Take the mean of the final measurement made in accordance with **8.2.1.3** or **8.2.2** ( as relevant ) as the width of the piece.

**8.4** Record the minimum and maximum widths.

### 8.5 Method 3

**8.5.1** *Relaxation and Relaxed Width*

Allow the piece to relax, free from applied tension, in the prevailing atmosphere for at least 24 hours. Then place the piece on the table ( at full width ) or folded down the middle if received in this state and use procedure given in **8.2.1.3** to determine its relaxed width.

**8.5.2** *Marking for Determination of Correction Factor*

Manipulate the piece as described in **8.5.1**, until the middle 2 to 3 m portion lies flat and free from applied tension on the table, and on this portion make four marks at points close to a selvedge and at least 25 cm but preferably 50 cm apart. Measare and record the width at each of the four marks.

**8.5.3** *Conditioning and Final Measurements*

Freely expose the portion marked in accordance with **8.5.2** ( with or without removal from the piece ) to the standard atmosphere until the difference between successive measurements, made at intervals of at least 24 hours, of the width of the fabric is less than 0·25 percent at each of the four measuring points. Record the mean of the last four readings.

**8.5.4** Calculate the width of the piece by the formula:

$$W_c = W_r \times \frac{W_{sc}}{W_s}$$

where

$Wc$ = width in cm of the piece after conditioning;

$Wr$ = mean width in cm of the piece after relaxation ( *see* **8.5.1** );

$Wsc$ = mean width in cm of the marked portion after conditioning ( *see* **8.5.3** );

$Ws$ = mean in cm of the marked portion after relaxation and before conditioning ( *see* **8.5.2** ).

**8.5.5** Calculate the minimum and the maximum width of the test piece by the formula:

$$Wm = Wmr \times \frac{Wsc}{Ws}$$

where

$Wm$ = minimum ( or maximum, as relevant ) width in cm of the piece after conditioning;

$Wmr$ = minimum ( or maximum, as relevant ) width in cm of the piece after relaxation ( *see* **8.5.1** );

$Wsc$ = mean width in cm of the marked portion after conditioning ( *see* **8.5.3** );

$Ws$ = mean width in cm of the marked portion after relaxation and before conditioning ( *see* **8.5.2** ).

### 8.6 Rounding Off

**8.6.1** Round off the widths calculated in accordance with **8.3** and **8.5.4** as follows:

a) Widths over 10 cm and not exceeding 50 cm to the nearest millimetre.

b) Widths over 50 cm and not exceeding 100 cm to the nearest 5 mm.

c) Widths over 100 cm to the nearest centimetre.

**8.6.2** Round off the minimum and maximum width recorded in accordance with **8.4** and calculated in accordance with **8.5.5** to the nearest millimetre.

## 9 TEST REPORT

The test report shall include the following particulars:

a) Type of the material tested;

b) Length of fabric;

c) Deficiency in length ( if required in case of lot of fabric );

d) Width of the piece : average, minimum and maximum width;

e) Whether the results were obtained by Method 1 or Method 2;

f) Whether or not the results include the lists or selvedges;

g) Details of any deviation from the specified test procedure.

# ANNEX A

( *Clauses* 7.2.2 *and* 8.2.1.2 )

## ARRANGEMENT OF PIECES FOR CONDITIONING AND MEASUREMENT

**A-1** A convenient and effective method of arranging a long piece of fabric for conditioning so that it is free from applied tension and is well exposed to the conditioning atmosphere is to unroll the piece and lay it in loose corrugated folds of suitable size ( *see* Fig. 1 ).

**A-2** During marking and measuring, it is essential that the piece of fabric whose width is being determined should be free from tension as it lies on the measuring table. To achieve this, it has been found convenient to cuttle-fold ( *see* Fig. 2 ) the ends of the piece which extend beyond the portion being measured, thus producing a stack of fabric at each end of the portion being measured.

**A-3** If the measuring table is too short to enable this method to be used, suplementary tables may be used at each end of the measuring surface provided that such extra tables are of exactly the same height and width as those of the main table, and that they are so placed as to form ( with the measuring table ) a continuous rectangular surface.

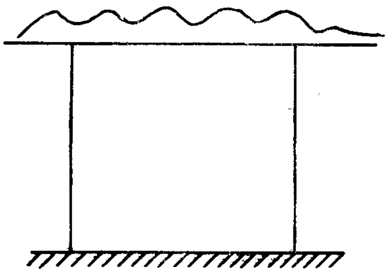

FIG. 1 LOOSE FOLDING

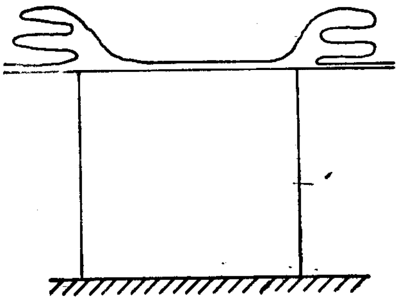

FIG. 2 CUTTLE FOLDING

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